Darwin: Multiple Planetary Signals

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The infrared space interferometer Darwin aims to detect other Earth-like worlds, analyze their characteristics, determine the composition of their atmospheres and investigate their capability to sustain life as we know it. If multiple planets are present, all the planets will be detected simultaneously, contributing to the overall signal with different intensities. The signal from multiple planets thus needs to be disentangled. One could use multiple observations of the same target system at different times, assuming that the movement of the planets will differ due to their orbits. Alternatively one can use spectroscopy or resize the array to disentangle the signal from planets at different orbital distances, as the response of the interferometer is well known. That will additionally give information on the composition of the signals from multiple sources. Note that one has to break the symmetry of the interferometer response to be able to determine the planets' real locations. This article shows the example for a system consisting of Venus, Mars and Earth for different proposed configurations.